

Tools and Strategies for Engaging the Supervisor in Technology-Supported Work-Based Learning, Evaluation Research

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This study reports the results of the formative evaluations of two computer-supported tools and the associated strategies for their use. Tools and strategies embedded in web-based courses can increase a supervisor's involvement in helping employees transfer learning onto the workplace. Issues relating to characteristics of the tools and strategies as well as factors influencing their likelihood of use are identified via summaries of the two evaluation studies.

Keywords: Supervisor Engagement, Tools and Strategies, Work-based Learning

The supervisor, or the supervisory team¹, plays an important role both in the formal and informal learning of his or her team members. For formal learning, the supervisor is seen as a facilitator of transfer of training, with roles before, during, and after the training event (Broad & Newstrom, 1992; Nelson & Dufour, 2002). For informal learning the supervisor can have a variety of roles such as monitoring, guiding, enabling sufficient exposure to learning situations, providing help and advice, or encouraging the learner to contact appropriate colleagues (Eraut, Alderton, Coles, & Senker, 1998). However, the supervisor is often the “weak link” in the transfer of training process (Robinson & Robinson, 1989). The supervisor may be reluctant to participate or may lack preparation for how to effectively support learning (Billett, 2002) or lack time or motivation. If the employee is involved in a course using Web-based technology the supervisor may lack insight into how the employee is studying because of the supervisor's unfamiliarity with the use of such a system. Thus when the course involves a non-traditional pedagogy, such as a new form of workplace learning that combines both formal and informal learning via courses that are centered on work-based activities learning (Bianco, Collis, Cooke, & Margaryan, 2002; Collis & Margaryan, 2003), the needs of the supervisor will be even stronger.

Tools and strategies are needed to help the supervisor in his or her new role (Kessels, 1993). Using the terminology of human performance technology (Stolovich & Keeps, 1992), there is a performance gap between current and desired performance, and to close this performance gap an appropriate intervention needs to be designed and evaluated. If the intervention involves tools or instruments for the supervisor, the supervisor must perceive them as having utility (usefulness) and user-friendliness (usability) before he or she will make use of them. Pilot versions of the tools thus require formative evaluation to improve both their usefulness and usability. In addition, in a multinational corporation, when the target group of supervisors includes individuals with different management styles affected, among other variables, by cultural differences, the adaptability of the tools and strategies for different contexts needs to be considered.

There are many sorts of tools and intervention strategies that could be used to increase the involvement of the supervisor in work-based learning. Some may involve incentives for the supervisor in terms of his own job-performance criteria. Others are under the control of the course-design team and the course facilitators. These can include tools such as messages or other forms of personal contact with the supervisor, informational material about the course directed at the supervisor, or (virtual) meetings or workshops. A learning agreement, or contract, in the form of a document structuring and recording a discussion and agreement between a course participant and his or her supervisor concerning course goals and support for course attendance is a particularly promising example of an intervention. Such an agreement can steer the participation of the learner towards the ways that performance change in the workplace is expected to be seen as a consequence of the course. Another type of intervention is particularly relevant for courses supported in a Web environment as it involves making supplementary material about the course and about how the supervisor can intervene at various times in the course for feedback to and support of the participant directly available to the supervisor via the Web environment. This type of intervention has the benefit of

¹ It should be noted that the term supervisor might be replaced by “supervisory team”. The supervisor is defined as the direct superior working with the team member and learner on a daily basis. However, in practice, it might be that others are carrying out aspects of supervision, for example when the supervisor is not an expert in the content that is being learned or “when teamwork is a key component of work practice” (Billet, 2002, p. 184).

also helping the supervisor to become familiar with the learning environment and types of learning activities in which the participant is involved. If a collection of different types of tools and strategies is integrated together in one electronic environment, this collection can be called an electronic performance support system (EPSS).

Problem Statement

Within the Learning & Leadership Development organization of Shell International Exploration and Production (LLD-SIEP) the problem of increasing supervisor involvement in learning is of particular significance because of a new learning strategy that focuses on work-based activities. The overall problem being investigated is: what tools and strategies, used in what conditions, can lead to increased supervisor involvement in technology-supported work-based learning? Through preliminary research (Bianco & Collis, 2003) an intervention has been identified consisting of an electronic performance support system (EPSS) and is in the process of development. Two particular components of the EPSS, a learning agreement and personalized materials added to the Web-based course environments supporting the participants, have been designed and are in the process of various cycles of revisions and formative evaluation. The problems relating to these two types of tools are: Are these types of interventions suitable for supervisors in the LLD-SIEP context? If they are suitable as general types, what features should they have in order to strengthen their likelihood of use by supervisors? Will supervisors perceive the tools as useful to themselves? Will they experience them as easy to use? Will it be advantageous to provide alternative forms of each type of tool, to anticipate differences in the supervisors themselves? The formative evaluations summarized in this paper address these questions.

Theoretical Framework

The supervisor's performance in terms of supporting learning, as with any type of performance, can be affected by appropriately designed interventions. Interventions are combinations of goals, strategies, and instruments (Stolovich & Keeps, 1992). A distinction can be made between instructional interventions such as courses and seminars, and non-instructional interventions (Greenworks Consulting Training Services, 2003). The latter category includes tools such as electronic performance support systems (EPSSs), knowledge management (KM) tools, tools offering just-in-time support, tools supporting the functioning of communities of practice, and job aides and strategies related to corporate culture changes and process re-engineering. When the performance change being focused upon includes working with electronic environments, the support tools typically also have an electronic component. A major category of non-instructional interventions is that of electronic performance support tools. An electronic performance support system can also be described as "any computer software program or component that improves employee performance by reducing the complexity or number of steps required to perform a task, providing the performance information an employee needs to perform a task, or providing a decision support system that enables an employee to identify the action that is appropriate for a particular set of conditions" (<http://www.pcd-innovations.com/infosite/whatepss.htm>). Leighton (n.d.) indicates that an EPSS typically includes some combination of the components shown in Table 1:

Table 1. *Components of Electronic Performance Support (Leighton, n.d.)*

Tools	Information Base	Advisor	Learning
Word Processing, Spreadsheet, Database	On-line Documents, Reference Materials	Expert Advice and Coaching	Multimedia CBT and Tutorials
Templates & Forms	Info Databases, Case History Data	Context-Sensitive On-Line Help	Simulations and Scenarios

The methodology for the design and development of such an electronic intervention relates to human performance technology (Stolovich & Keeps, 1992) and also to software-design research more generally (Reeves, 2000). In the design of an EPSS a number of key issues must be considered. One of these is the content of the EPSS: Which of the types of tools and resources indicated in Table 1 should be included? And once the choice for a type of component is made, how should the component be further realized? The development process of an EPSS and of its component tools and resources involves many iterations of pilot testing with design experts and performance analysts as well as the target users, in order to identify which aspects of the tool will be perceived as having the most

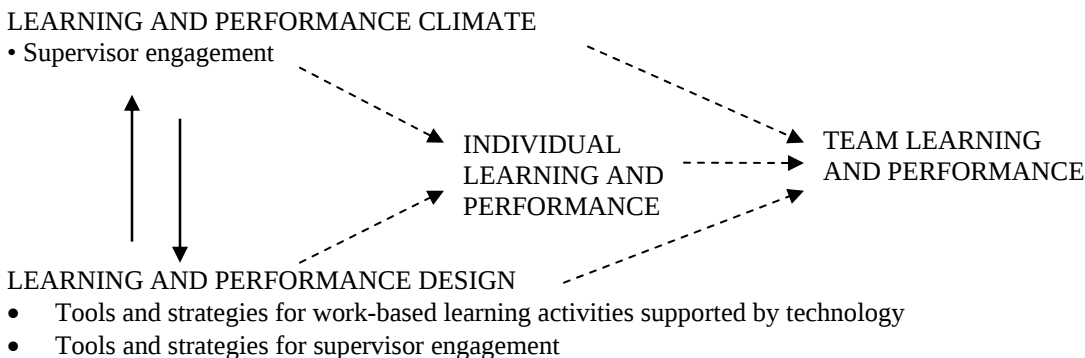
value, or utility, and which aspects will most affect the ease of use, or usability, of the tool in order to increase its likelihood of use in practice (Sweeney, Macquire, & Shakel, 1993).

Research Setting

The context for this research project is the Learning & Leadership Development organization of Shell International Exploration & Production B.V. (LLD-SIEP). LLD-SIEP supports learning for technical professionals within SIEP worldwide. At the LLD-SIEP a form of technology-supported course is being implemented based on a model of learning that involves different types of work-based activities, predominately carried out in the workplace with the support of the supervisor as well as others with relevant experience (Bianco, Collis, Cooke & Margaryan, 2002). Work-based learning within these courses is supported by web-based course environments that are part of the TeleTOP system, a blend of a course management system and learning content management system (Collis & Moonen, 2001). The work-based assignments involve colleagues and supervisors and are aimed at solving actual challenges that the learner's team is facing in practice.

An important part of a five-year collaborative research project between the LLD-SIEP and the University of Twente focuses on the development of tools and strategies to support this approach to workplace learning. At the LLD-SIEP courses are designed by teams that include subject matter experts and designers. Tools and strategies for supervisor involvement are among the focuses in the design process. This portion of the overall research can be characterized as development research (Reeves, 2000) and has “the dual objectives of developing creative approaches to solving human teaching, learning, and performance problems while at the same time constructing a body of design principles that can guide future development efforts” (Reeves, 2000, p. 7). Figure 1 shows the model for part of the overall research that focuses on supervisor engagement. The dotted lines are taken as assumptions; the focus of the current research is on the vertical arrows relating to supervisor engagement levels and tools and strategies as interventions that can affect this engagement.

Figure 1. A Model to Study Supervisor Engagement in Technology-Supported Work-based Learning: Effect of Tools on Supervisor Engagement and Effect of Supervisor Engagement on Individual Performance.



Within the research represented in Figure 1, a variety of tools and strategies to involve the supervisor are being developed and evaluated in an iterative manner. The two examples whose evaluations are reported in this paper are the “Learning agreement”, an electronic template for a letter of commitment between supervisor and participant; and “Resources and activities embedded in the course Website”, additions to the course web-environment specifically designed for supervisors to encourage their participation. The formative evaluations presented in this paper are part of this portion of research.

Research Questions

This study focused on the following questions:

1. How are the learning agreement and course-addition tools perceived in terms of utility and usability by domain experts, performance-analysis experts, and tool-design experts as well as supervisors and course participants?

2. How are the learning agreement and course-addition tools perceived in terms of utility and usability by the LLD-SIEP course designers?

Example 1: The Learning Agreement

The learning agreement is one of the tools for supervisor engagement being developed within LLD-SIEP. The learning agreement aims at supporting participants in negotiating with their line managers for suitable conditions to complete the work-based course, and understanding what goals are to be achieved by participating in this course and how it is intended to be followed. It consists of an electronic template for a letter of commitment between supervisor and participant that covers goals to be achieved during the course, relation of the course to workplace needs, and resources available to the participants to follow the course. Participants fill in the learning agreement jointly with their supervisor as first activity of a course and submit the agreement in the course web-environment where it remains available for review and for use during the final evaluation

The learning agreement piloted at LLD-SIEP was structured in five sections. These included: course participant's details and his or her line manager's name and email; dates during which learning agreement was valid and persons involved; description of a workplace situation that suggested a business need for the course and how successful completion of the course would impact on it; conditions under which the course participant was following the course, such as where and when he or she intended to study and if time would be made available for learning activities. It is the selection of the workplace activity or problem, which will be the focus of the course that is particularly critical because it is in this that the learning becomes anchored in real workplace needs.

Pilot Test Setting

The Learning Agreement was first designed and piloted in 2002 in a course called Health and Risk Assessment (Bianco, 2003). This course was designed to take practitioners involved at different levels and in different roles in the health- and risk-assessment process to the skill level necessary to carry out an assessment in their own workplaces. Participants worked both for Shell EP Operating Units worldwide and for contractor companies. The course consisted of seven e-modules and a number of activities that extended the concepts in the e-modules and were carried out in the real workplace settings of each participant. Each module consisted of a theoretical portion developed as an e-module and a number of self-assessment questions. After completing each e-module participants were required to carry out assignments that involved the application of what they had learnt in their own workplaces and also regularly required the involvement of the local HRA team. Results of the assignments were submitted via the TeleTOP system. Course participants were expected to finish the course in four weeks, but completion could take up to a maximum of six weeks. The course took place entirely at a distance. The learning agreement was the focus of the first activity of the course. The course did not involve any face-to-face component but was entirely carried out in the workplace, with support of the TeleTOP system.

Method and Respondents

This study employed qualitative methods to explore supervisors' and participants' perceptions of the learning agreement as a tool to involve the supervisor in the course HRA. There were 18 participants and 15 supervisors. All completed a learning agreement, and all but one participant indicated his or her supervisor's email addresses. These sets of participants and supervisors were invited to participate in semi-structured telephone-interviews that were carried out between September and October 2002. Additional documents were also analyzed to provide insight into the interview data. These were the course participants' descriptions of themselves and their work uploaded in the TeleTOP course-management system and the learning agreements themselves. Both types of documents were submitted as course assignments. The uploading of participant descriptions as an assignment was meant both to familiarize them with the course-management system and to help them to get to know the other course participants.

In addition to being a tool undergoing pilot testing, the learning agreement was also a key tool for data collection as via it participants indicated the names and emails of their supervisors. This means that only supervisors whose names had been indicated in the learning agreement were contacted, thus not all the supervisors whose employees were following the course.

Interviews were recorded and transcribed. The supervisors' answers were then compared to find emerging patterns. The same procedure occurred for participants' answers. Then, once preliminary patterns were found, participants' descriptions and learning agreements were re-analyzed to provide additional insight (Bianco, 2003).

Results

Response rate. Of the supervisors and participants who submitted the learning agreement, only 8 supervisors and 12 participants agreed to be interviewed. In the end, only 4 supervisors and 8 participants were interviewed. Their busy schedules and time-zone difference made it impossible to arrange a suitable time for some of the appointments. This response rate, 28% for the supervisors, was low. However, the course participants' response rate

was also lower than expected, namely 44% (8 out of the 18 that submitted learning agreements). There appeared to be two reasons for this. Participants' work descriptions in the course Web environment show that they come from and work all over the world, and so do their supervisors. Thus was logistically difficult to contact them and arrange a suitable time to interview them (phone connection, time differences). In addition, cultural differences could influence their perceptions of their roles and duties (Wang, Ruona, & Rojewski, 2003) and thus perhaps influenced the response rate. Interestingly, from the analysis of the learning agreements it emerged that participants who did not answer the interview request had a lower level of support from their supervisor than participants who did. Also they were away from their workplace for other job assignments longer.

Participants' and supervisors' perceptions of the learning agreement. An interesting contrast between participants and supervisors emerged with respect to the utility of the learning agreements. Except for one, all participants thought the learning agreement was useful in getting their supervisors' support by clarifying expectations and requirements for course participation and communicating to their supervisors about what they were doing. However, they thought the learning agreement had not helped them in getting appropriate resources (such as computer, or a quiet room to study) to follow the course. The supervisors' perceptions were less enthusiastic. Two out of three defined the learning agreements as "just more paperwork" and could not see any utility in it. One suggested that the total amount of hours the course participant is expected to spend on the course should be clearly indicated.

Another interesting aspect emerged with respect to the increase in workload for the participants caused both by the course assignments and the fact that they were expected to keep up with their already-overloaded job tasks. This overload seemed to be an acceptable situation in the opinion of the supervisors who did not expect any problems for participants to complete the course. Interestingly, this was true to a certain extent also for the participants: for five participants the course added to an already heavy workload, but only three of them thought they would not be able to meet the deadline.

Current Status

Taking into account the insights gained during the formative evaluation, the learning agreement is currently in use in all TeleTOP-supported courses now being offered to the Shell EP business. Different versions of the learning agreement are currently being developed as part of the ongoing research on tools and strategies. Further evaluation is taking place to codify and analyze the contents of the learning agreements and relate them to the impact of the course in the workplace.

Example 2: Resources and Activities Embedded within the Course Website

For the intervention piloted at LLD-SIEP and reported in this paper, resources and other additions for the supervisor included an introduction to the work-based learning strategy, a description of what is available for the supervisor in the embedded EPSS, a description of the need for a learning agreement, a set of examples of the benefits of the supervisor's involvement in work-based activities, a reflection moment in the form of a questionnaire, guidelines for a debriefing meeting, a fill-in-form for an action plan to complete with the team member after the course, and a questionnaire to reflect on the team member's performance improvement and to relate the observed performance to what was planned for in the learning agreement.

All these tools function as a type of embedded EPSS (Sleight, 1993). Parallel to the design of these embedded resources the course design also needs to call for the supervisor's involvement via suitable activities. The embedded additions to the site specifically for supervisors then encourage the supervisors to know how to participate. The underlying strategy is that supervisors' access to the course website is first step towards establishing a learning partnership.

Resources and activities are to be included in the course roster. The roster is one of the main features of the TeleTOP system and consists of a matrix-type structure that displays the organization of the course and integrates materials, activities, and feedback (Collis & Moonen, 2001). There are many ways to make such components of an embedded EPSS available to supervisors. In the pilot described next, two sets of alternative ways were developed, presented to the target group, and evaluated. While the learning agreement pilot focused more on the utility of the tool, the embedded EPSS pilot focused more on the usability.

Pilot Test

Two alternative sets of embedded EPSS components were developed to be integrated into two otherwise identical course web environments. The pilot test refers here to the feedback gathered both in the development and evaluation of the first prototype carried out respectively in Q1, 2003 and Q2, 2003 (Tang, 2003). The methods used are described in the next section.

Method

Development method. Resources and additions embedded within the course Website were developed using a rapid-prototyping approach (Reeves, 2000). A first draft of the components of the EPSS based on a preliminary task analysis was prepared. Feedback was collected from different stakeholders at the LLD-SIEP during individual semi-structured face-to-face interviews. Stakeholders included one of the directors of the LLD-SIEP, the senior learning advisor, two instructors, and a marketing expert. Adjustments to the design of the components followed. The modified new draft of the contents was later discussed during a meeting with the senior learning advisor and a business consultant, who agreed on the general design decisions and suggested a number of further specific design decisions. The general design of the components was then worked out in two different styles of language and tone of presentation, based on an analysis of key differences in supervisors from different regions internationally in Shell EP (Tang, 2003). Two versions of the embedded EPSS were then prepared, underwent an expert review, and adjusted once again based on the experts' comments relating to usability and aspects that differentiated one of the versions from the other.

Evaluation method. Data were collected via a questionnaire that included questions about the utility and usability of the tools. Issues about cultural diversity were also included since the two versions of the tools were designed to account for differences between Western and Asian supervisors. The URL of the website where the tools could be viewed was included in the invitation letter for the evaluation, together with a description of the tools and instructions for how to fill out the questionnaire.

Results

Respondents. The questionnaire was sent to 25 persons. Of these, 17 answered, namely 5 LLD-SIEP learning designers, 11 students of Chinese nationality involved in the HRD Masters program at the University of Twente, and one learning expert from the faculty of the university. The Chinese students were included because of their HRD background. Besides based on their experience with managers in China they could comment on the presentation style and the tone of instruction. No actual Shell EP supervisors were directly involved because they had to be first introduced to the TeleTOP system and it was judged not convenient for them at this point in time to view such an early prototype. Each studied the two alternatives of embedded EPSSs and completed the evaluation questionnaire.

Utility. The ideas of resources and activities for supervisors embedded within the course Website were generally well accepted, and thought to be useful and appropriate, as shown in Table 2. However, 35% of the respondents thought the number of activities was too much to expect of the supervisors.

Table 2. *Results with Respect to Utility (N=17).*

• Idea of using this tool to build communication with supervisors is good (88%)
• Content is appropriate (82 %)
• Amount of activities is too much (35%)
• Improves supervisor's support skills (82%)
• Encourages supervisor's involvement (71%)
• Expects trainee to feel more supported by supervisors that use this tool (71%)

Usability. Usability aspects need to be further improved, particularly in the wording of several of the sets of instructions. Because of reservations with respect to the clarity of wording of instructions, which were only thought to be attractive and persuasive by 29% of the respondents, the usability of the embedded EPSS was not considered to be high in its current version, as shown in Table 3.

Table 3. *Results with Respect to Usability (N=17).*

• Supervisors will like the form and layout (47%)
• Instructions are clear (47%)
• Instructions are attractive and persuasive (29%)
• Instructional tone is friendly (41%)

Current status

After the development of the first prototype the development method for the tools and strategies has evolved. The researcher now works together with course designers and instructors to develop or adapt, implement, and

evaluate the tools as the course itself is being designed and developed and piloted. This is valuable for several reasons. First, both designers and instructors need to feel ownership of the tools they use, and tend not to accept tools that have been developed without their input. Secondly, the course design needs to include features that anticipate the use of the tools by the supervisors during the course so that the supervisors have a structure for intervening in the learning process of their team members.

Discussion

The pilot of the learning agreement clearly showed that attention to supervisors' perceptions of the learning agreement should continue to occur in order to help evolve it into a useful tool. Supervisors' perceptions of learning and other factors that influence their likelihood to become involved in learning as well as barriers to their involvement should be further investigated. More generally, feedback from the supervisor is of key importance in further developing this type of EPSS tool. Ideally, such tools should be developed jointly. There are several reasons for this: if a supervisor does not see the utility of a tool he or she will not use it, and more positively a supervisor can give suggestions to improve the tool. For example during the pilot, one supervisor suggested that the estimate of amount of total time required for the course should be added. The pilot of the embedded EPSSs show that offering options to the supervisors, in terms of tone and style of approach in the EPSS, needs to be studied further.

Also, courses differ considerably in their design and in the conditions in which they take place. This means that tools need to be adaptable with each course, but also that the researcher needs to understand this complexity in order to develop suitable tools. An approach in which a variety of tools and versions of the tools are developed jointly together with course designers and instructors, piloted, and evaluated involving actual participants and supervisors is seen as appropriate. This will strengthen the further development of a portfolio of tools and strategies and guidelines for how to use them in different situations. It is this portfolio that will be integrated into the overall EPSS for performance support of supervisors that is to be completed in 2005.

Contribution to HRD Knowledge

There is not much research that focuses on the role of the supervisor when technology-supported courses focus on work-based activities. The current study contributes to HRD knowledge related to electronic performance support because it identifies tools and strategies that can be used by supervisors when employees are taking web-based courses and also to a new type of partnership involving educational technologists, performance analysts, course designers and supervisors themselves. The methodology used for the design and development work (Reeves, 2000) is well known in fields involving electronic performance and learning support but not often seen in HRD research. This is another contribution to the HRD community.

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